

REMARKS

Summary of the Amendment

Upon entry of the above amendment, the claims 3, 11, 15, 16 and 22 will have been amended and claim 31 will have been added. Accordingly, claims 1-24 and 31 will be pending with claims 1, 16 and 31 being in independent form. Reconsideration of the Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

Support for New Claim 31

Support for new claim 31 can be found in, e.g., original claim 1 and Figs. 4-7. Applicant submits that no new matter has been added.

Specification

Applicant has reviewed the specification and found no errors.

Summary of the Official Action

In the instant Office Action, the Examiner rejected claims 1-24 over the art of record. By the present amendment and remarks, Applicant submits that the rejections have been overcome, and respectfully requests reconsideration of the outstanding Office

Action and allowance of the present application.

Traversal of Rejection Under 35 U.S.C. § 103(a)

Applicant traverses the rejection of claims 1-24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,723,541 to SUGII et al. in view of US published patent application 2004/0235264 to FORBES et al. Applicant respectfully traverses this rejection.

As to the independent claims, the Examiner asserted that SUGII discloses or suggests all the features recited in these claims except for, among other things, removing a portion of the substrate underneath the silicon germanium layer to form a void in the substrate. However, the Examiner asserted that FORBES teaches, among other things, this feature.

Notwithstanding the Office Action assertions as to what each of SUGII and FORBES discloses or suggests, Applicant submits that no proper combination of SUGII and FORBES discloses or suggests, for example, removing a portion of the substrate underneath the $\text{Si}_{1-x}\text{Ge}_x$ layer to form a void in the substrate and filling the channels and the void with a dielectric material (claim 1). Applicant also submits that no proper combination of SUGII and FORBES discloses or suggests, for example, removing a portion of the first silicon layer under the $\text{Si}_{1-x}\text{Ge}_x$ layer to form a void in the first silicon

layer of the substrate from the first channel to the second channel, filling the first and second channels and the void with a dielectric material, and forming a strained semiconductor layer on the $\text{Si}_{1-x}\text{Ge}_x$ layer (claim 16).

SUGII apparently discloses a substrate which includes channels 14 formed through a silicon germanium layer 4 (see Fig. 10) and silicon dioxide 15 filling the channels 14 (see Fig. 11). However, SUGII is entirely silent with forming a void under the silicon germanium and also filling the void under the silicon germanium layer. Indeed, the Examiner has acknowledged as much in the Office Action.

FORBES discloses a substrate which includes channels 835 formed in a silicon substrate 834 (see Fig. 8D) and discloses that the silicon substrate rows portions 836 can be completely undercut (see Fig. 8E and paragraph [0049]). However, contrary to the Examiner's assertions, the substrate 834 does not include a silicon germanium layer, and such a layer is clearly not provided prior to the channels 835 being formed. To the contrary, Fig. 8B shows that the channels 835 are formed without any layers on the substrate 834. Moreover, Figs. 8C and 8D show only a nitride cap layer 837 formed on the substrate 834 after the rows are formed by the channels. Thus, contrary to the Examiner's assertions, FORBES is entirely silent with regard to forming a void under the silicon germanium and also filling the void under the silicon germanium layer (claims 1 and 16). Thus, Applicant submits that the above-noted claims are not disclosed or

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suggested by any proper combination of SUGII and FORBES.

Applicant directs the Examiner's attention to the guidelines identified in M.P.E.P section 2141 which state that

"[i]n determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification."

In re Linter, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

As this section clearly indicates,

"[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."

Moreover, it has been legally established that

"[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) Although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.' 916 F.2d at 682, 16 USPQ2d at 1432.). See also *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992) (flexible landscape edging device which is conformable to a ground surface of varying slope not suggested by combination of prior art references)."

Additionally, it has been held that

"[a] statement that modifications of the prior art to meet the claimed invention would have been well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)."

Additionally, Applicant submits that there is no motivation to modify SUGII in view of FORBES or in a manner which would render obvious Applicant's invention, and additionally, Applicant submits that there is no motivation or rationale disclosed or suggested in the prior art to modify the applied references in the manner suggested by the Examiner. The Examiner's opinion does not provide a proper basis for these features or for the motivation to modify or combine these documents in the manner suggested by the Examiner. This is based, in part, on the fact that all of the features of the claimed invention are not even shown in the combination of references. Therefore, Applicant submits that the invention as recited in at least independent claims 1 and 16 is not rendered obvious by any reasonable inspection and interpretation of the disclosure of the applied references.

Furthermore, Applicant submits that dependent claims 2-15 and 17-24 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicant submits that no proper combination of SUGII and FORBES

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discloses or even suggests, in combination:

the features recited in claims 2-15 in combination with the features recited in claim 1; and

the features recited in claims 17-24 in combination with the features recited in claim 16.

Applicant notes, for example, that, contrary to the Examiner's assertions in the Office Action, SUGII and FORBES each fails to disclose or suggest:

the channels extend to the bottom of the first layer of the substrate as recited in claim 2;

the etching resistant surfaces recited in claims 4 and 5, that the removing produces a relaxed portion having a silicon germanium layer as recited in claim 6;

the annealing step after the void is formed as recited in claims 7 and 17;

the thickening of the silicon germanium layer as recited in claims 11 and 24; and

the planarization after the filling as recited in claim 18.

The Examiner has failed to specifically identify these features in SUGII and FORBES at the asserted passages.

Applicant requests that the Examiner reconsider and withdraw the rejection of the above-noted claims under 35 U.S.C. § 103(a).

New Claim is also Allowable

Applicant submits that the new claim 31 is allowable over the applied art of record. Specifically, claim 31 recites a combination of features which are clearly not disclosed or suggested by the applied art of record. Specifically, Applicant submits that the applied documents fail to disclose or suggest, for example, forming a plurality of channels in the $\text{Si}_{1-x}\text{Ge}_x$ layer and in a top layer of the multi-layer substrate, after forming the plurality of channels, removing the top layer of the multi-layer substrate underneath the $\text{Si}_{1-x}\text{Ge}_x$ layer to form a void defined by an undercut border in the multi-layer substrate, and filling the channels and the void with a dielectric material as recited in claim 31.

Accordingly, Applicant respectfully requests consideration of this claim and further request that the above-noted claim be indicated as being allowable.

CONCLUSION

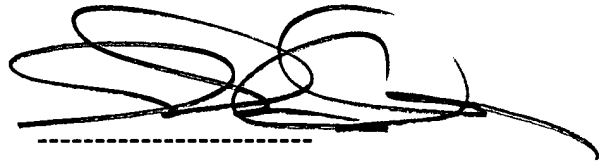
In view of the foregoing, it is submitted that none of the references of record, either taken alone or in any proper combination thereof, anticipate or render obvious the Applicant's invention, as recited in each of the pending claims. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out. Further, any amendments to the claims which

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have been made in this response and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto. Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

Authorization is hereby given to refund excess payments and charge any additional fee necessary to have this paper entered to Deposit Account No. 09-0458.

Respectfully submitted,
K. CHENG et al.

A handwritten signature in black ink, appearing to read 'Andrew M. Calderon', with a horizontal dashed line underneath it.

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